

TYPE STUDIES IN THE CLAVARIOID FUNGI—VIII

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The type specimens of several clavarioid taxa are described, and modern placement of these names discussed. *Ramaria atkinsonii* (Bres. in Atk.) R. H. Petersen, *Ramariopsis dealbata* (Berk.) R. H. Petersen, and *Ramaria decolor* (B. & C.) R. H. Petersen are proposed as new combinations.

'Housekeeping' in taxonomy is a tedious process, but satisfying in that examination of type specimens is the only sure way to lead to a stable classification. The type specimens redescribed below were sought as part of my work on Pacific clavarioid fungi, and most have been revealing for reasons discussed under each.

Clavaria alaicornis Zollinger & Moritz. 1844. In *Natuur- Geneesk. Arch. Neerl.-Indie*, p. 382. Holotype: L (cf. Petersen, 1981); representative specimen: PC – herb. Zollinger, ... Tjuruk ..., 2. iii. 1843, no. 1125, *Planta Javanica Exsiccati*.

The PC material, while numbered as the holotype at L, does not include location data as near Tjikoya (unless Tjuruk is synonymous), and the collection data do not agree with that of the original description. Instead, there is a second label by Léveillé and to it has been added (in a third handwriting) '*ad terram pr. tjikoya*'.

At the same time, the specimen comprises most of one fruitbody (the stipe portion is missing), similar in shape to that in the Leiden specimen. Tramal hyphae are unclamped, the hymenium is adherent, and spores are as described previously (Petersen, 1980). In short, I consider this specimen to represent *Clavaria zollingeri*, as does the L material.

Corner (1950, 1970) treated the species in *Clavulinopsis*, but his specimen at PC (Malaya, Tembeling, 9.xi.1930, *Corner 556*) is a *Clavulina*, perhaps *C. leveillei* var. *atricha*.

Clavaria angulispora Patouillard. 1888. In *Bull. Soc. mycol. Fr.* 4: 41.
≡ *Scytinopogon angulispora* (Pat.) Corner. 1950. In *Ann. Bot. Mem.* 1: 648.
Holotype: FH – herb. Patouillard, Orenoque, no date, *A. Gaillard*, s.n. (annot. Corner).

My observation of this specimen supports Corner's annotation, which reads as follows: 'This collection of Gaillard represents a species of *Clavulina* which I identify with *Clavulina connata* (Berk.) Corner, though Gaillard's specimen has slightly smaller spores. A. Gaillard. Orenoque: – sp. 6.5–8 × 4.7– 6 µm, broadly ellipsoid, *smooth*, not angular:

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basidia typical of *Clavulina*, 2-sterigmate: hyphae 2.5–5.5 μm wide, *without* clamps. 27.iv.55.' Thus it was Corner's opinion, and mine, that the 'type' specimen hardly conformed to the leading specific character, angular spores.

Further nomenclatural problems follow, for Corner continued to use this epithet as placed in *Scytinopogon* through 1970, even though he had annotated the type specimen in 1955. First, when Corner (1950) transferred *angulispora* from *Clavaria* to *Scytinopogon*, he placed *Pterula pallescens* Bresadola [\equiv *Lachnocladium pallescens* (Bres.) Bres.; \equiv *Scytinopogon pallescens* (Bres.) Singer, 1945] in synonymy under *S. angulispora* (Pat.) Corner. Because *pallescens* has priority over *angulispora* in *Scytinopogon*, Corner's transfer of *angulispora* created a nomen superfluum (assuming that *S. pallescens* and *S. angulisporus* are taxonomic synonyms). Under these conditions, the correct name for the taxon is *S. pallescens*.

Second, and perhaps worse, Corner (1950: 647) listed *S. angulisporus* as the type species of the genus, on the basis (presumably) of his own mistaken synonymy. The type species, named by Singer, was *Clavaria (Scytinopogon) pallescens* Bres.

Whether Patouillard erred in his description of the Gaillard specimen, or whether he (or someone later) muddled the specimen itself, is not known at this time. Until some more appropriate specimen is unearthed however, the Gaillard specimen cannot be overlooked, and I must accept *Clavaria angulispora* as a synonym under *Clavulina connata* (Berk.) Corner.

With *angulispora* eliminated from *Scytinopogon* on this basis, there is even less reason why *S. pallescens* should not be used, barring some equally unfortunate taxonomic confusion over its type.

Lachnocladium atkinsonii Bresadola in Atkinson. 1902. In J. Mycol. 8: 119.

Holotype: S — herb. Bresadola, USA, North Carolina, vic. Blowing Rock, viii-ix. 1899, G. F. Atkinson 4216.

Fruitbody (Fig. 2) one, 105 \times 45 mm, somewhat pressed, elongate obpyriform in outline. Stipe single, 50 \times 8 mm, cylindrical, white, tomentose with superficial strigose bloom, evidently mostly below substrate level, involving very little substrate, originally terete, drying chalky-friable. Major branches 2–3, strictly ascending; branches erect, rebranching in 5–6 ranks; axils rounded, internodes long, diminishing gradually; apices minutely dichotomous to quadrifid. 'Entire plant and spores ochre-yellow' (Atkinson).

On soil in mixed woods.

Tramal hyphae of stipe 6–10 μm diam., hyaline, thin-walled, hardly inflated, clamped, interwoven; ampulliform clamps up to 10 μm broad, thin-walled, knuckle-shaped, minutely ornamented. Hyphae of stipe surface 2–3 μm diam., hyaline, clamped, adherent except for free tips, thin-walled. Tramal hyphae of branches 5–12 μm diam., hyaline, clamped (at least occasionally), more or less parallel. Basidia 60–75 \times 10 μm , clavate, clamped; contents homogeneous to granular; sterigmata 4, stout, divergent.

Spores, (Fig. 1) 10.8–13 \times 5.0–5.8 μm ($E = 1.88$ – 2.40 ; $E_m = 2.09$; $L_m = 11.58$ μm), broadly cylindrical to narrowly ellipsoid, flattened adaxially, barely roughened in profile; contents homogeneous or with a few small guttules; wall up to 0.3 μm thick; hilar appendix prominent, somewhat curved, without discernable throat; ornamentation of very low, sparse warts or low meandering ridges arranged in generally longitudinal or spiralled configurations, but many spores without discernable ornamentation.

The taxon should be well marked in the field by the single stipe bearing a tomentum, and yellow-ocher color. The long internodes may be a function of age. Microscopically, the tomentum hyphae, friable flesh, clamps, and spore characters are diagnostic. Under oil magnification, the spores are hardly roughened, but the wall appears gritty. In cotton blue, ornamentation can be seen on some spores.

Coker (1923) could not locate the type specimen at CUP or S, and assumed the taxon to be the same as *Clavaria* (*Ramaria*) *stricta*, but that species is a member of *Ramaria* subg. *Lentoramaria*, with dimittic rhizomorphs, etc. The type specimen of *L. atkinsonii* must be placed in subg. *Laeticolora*.

Several taxa with similar fruitbodies must be separated as follows:

Ramaria flavo-brunnescens: stipe brunnescent, spores small and consistently ornamented.

R. obtusissima: much larger fruitbodies and smooth, larger spores.

R. flava: stouter fruitbodies, larger spores and tapering, smooth stipe.

Bresadola received the type specimen from Atkinson, wrote the Latin description and apparently sent it (perhaps together with a portion of the specimen, although Coker did not locate it) back to Atkinson, who published it. The correct citation must be as above.

Bresadola observed that the hymenium was unilateral, which led him to placement in *Lachnocladium*, but this character is relatively common in *Ramaria*, and the type fruitbody clearly fits in the latter genus.

Corner (1950) treated *L. atkinsonii* as a possible synonym under *Lentaria micheneri*, perhaps because of Bresadola's report of smooth spores and Coker's inclusion under *Clavaria stricta*. The taxon is not a *Lentaria*. Remarkably, I cannot find a later name under which this taxon fits, nor do I have such a taxon in my notes and keys. To find a yellow *Ramaria* from the southern Appalachians not known to me by now is surprising. Nonetheless, the name must be transferred as follows:

Ramaria atkinsonii (Bres. in Atk.) R. H. Petersen, *comb. nov.*. Basionym: *Lachnocladium atkinsonii* Bres. in Atk. 1902. In J. Mycol. 8: 119.

Clavaria bessonii Patouillard. 1885. Tab. Analyt. Fung., Ser. I, p. 163.

≡ *Clavulina bessonii* (Pat.) Corner. 1950. In Ann. Bot. Mem. 1: 299.

Holotype: herb. Patouillard, Jura, autumn, 1884, *Patouillard & Besson* (not located). Neotype: FH — herb. Patouillard, Bois de Gerage, Jura, 7.viii.1890, s.n.

The specimen at FH reported on by Corner (1970) and assumed by him to be the type cannot qualify as such, for it was collected some five years after the original description. Moreover, Corner stated that the specimen did not conform to the circumscription by Patouillard. Differences between the 1890 specimen and Patouillard's circumscription are qualitative, however. Corner's report of spore dimensions (8.5–9.5 × 7–8.5 μ m) was correct, and fruitbodies are taller than as reported by Patouillard (up to 25 mm high). I surmise that in the absence of a holotype specimen, the 1890 specimen may be accepted as a neotype.

Lachnocladium cartilagineum Berkeley & Curtis. 1868. In J. Linn. Soc. (Bot.) 10: 330.

≡ *Clavulina cartilaginea* (B. & C.) Corner. 1950. In Ann. Bot. Mem. I: 298.

Type (isotype): FH — Cuba, X, C. Wright 204, B. & C. Fung. Cub. no. 388.

Fruitbodies two, branched vase-shaped, pressed; stipe discrete, up to 16×2 mm, lobed in cross-section, smooth, here and there with small patches of minutely cottony mycelium, arising from mycelium in soil but with no discernable mat. Branches in 2–4 ranks, flattened, drying cartilaginous; hymenium apparently unilateral; axils narrowly rounded; internodes diminishing gradually; apices awl-shaped to minutely dichotomous, not cristate.

Trama hyphae of branches $2.5\text{--}4.5\ \mu\text{m}$ diam., uninflated, hyaline, without clamp connections, loosely parallel, thin-walled to somewhat thick-walled (wall up to $0.3\ \mu\text{m}$ thick). Tramal hyphae of stipe similar, but with walls up to $0.5\ \mu\text{m}$ thick. Hymenium thickening up to $600\ \mu\text{m}$, coherent, of effete basidia and subbasidial cells; basidia not supporting measurement (about $30\text{--}40\ \mu\text{m}$ long), hyaline; contents homogeneous; post-partial septation not observed; sterigmata two, slender, spindly, divergent-curved.

Spores $7.9\text{--}8.6 \times 6.1\text{--}8.3\ \mu\text{m}$ ($E = 1.04$; $E^m = 1.16$; $L^m = 8.25\ \mu\text{m}$), subglobose to broadly pip-shaped, hyaline, smooth, thin-walled, uniguttulate; hilar appendix broad, papillate.

Corner's (1950) commentary under *Clavulina cartilaginea* is excellent. One fruitbody from the type specimen is very similar to his text fig. 115, lefthand figure, the other being considerably closer in gross appearance text fig. 131, left figure, under *C. decipiens*, and indeed several characters are quite similar, from significantly thickened hymenium to spore dimensions. Two characters separate the two: (1) Clamps in *C. decipiens*, none in *C. cartilaginea* (Corner reports a few from his specimens); and (2) inflated stipe tramal hyphae in *C. decipiens*, uninflated in *C. cartilaginea*. Both appear to be tropical taxa.

Most surfaces of fruitbodies have dried cartilaginous, with the hymenium translucent and waxy. Where the hymenium has remained dry, it flakes off in very small patches. This reflects the very thick hymenium and almost non-existent subhymenium.

The hymenium appears to be composed of hyaline, withered bricks on end, substratified, with only the surface basidia still intact. Because both fruitbodies are mature, no young hymenium was observed, and basidial measurements were impossible to obtain.

Lachnocladium chartaceum Patouillard. 1907. In Anns mycol. 5: 365.

Type: FH — herb. Patouillard, Brazil, Prov. Sao Paulo, Campinas, iii.X.1897, F. Noack 834.

Annotation, E. J. H. Corner: '*Scytinopogon pallescens* (Bres.) Singer. [= *S. angulispurus* (Pat.) Corner, Monograph of Clavaria, etc. 648. This is the type of *Lachnocladium chartaceum* Pat., and has the characteristic spores ($5\text{--}6 \times 3\text{--}3.7\ \mu\text{m}$, echinulate,) and uninflated hyphae. ix.55].'

Fruitbodies two, up to 65×37 mm, pressed, arbuscular. Stipe discrete, up to 6×5 mm, arising from mycelium-invested duff, but with no (? remaining) mat, clothed below in white, felty mat, smooth and suede-like above, ? flattened; branches in 3–5 ranks, flattened, probably white or off-white when fresh; internodes diminishing gradually; axils rounded; apices flagelliform, long, slender, awl-shaped; hymenium clearly uni-

lateral, appearing waxy, matt; sterile surfaces drying cartilaginous; flesh drying cartilaginous.

Tramal hyphae of branches 1.8–3 μm diam., hyaline, uninflated, clamped, thin-walled, strictly parallel, tightly packed. Hymenium thickening; basidia 15–20 \times 6–8 μm , broadly digitate, four-sterigmate.

Spores (Fig. 10) 5.0–6.1 \times 3.2–4.0 μm ($E = 1.40$ – 1.89 ; $E^m = 1.62$; $L^m = 5.61 \mu\text{m}$), irregularly ellipsoid, thin-walled; contents obscure; hilar appendix small, papillate; ornamentation of gross spines, sometimes saddle- or molar-shaped, up to 1.2 μm high, so stout as to distort the outline of the spore profile.

This is clearly a *Scytinopogon*, as indicated by Corner. For comments on his use of *S. angulispora*, see under that species. I would hesitate to accept this synonymy on two bases: (1) I am not familiar enough with the genus to judge, and (2) spore ornamentation in *L. chartaceum* is mostly of spines, not saddle-shaped warts as in *Scytinopogon pallescens*.

Clavaria colensoi Berkeley. 1855. In Hooker, *Flora of New Zealand*, p. 186.

Type specimen (holotype): K – New Zealand, no date, *Colenso*, herb. Berkeley, s.n., Annot. Dodd, viii. 70. Isotype: PDD.

Fruitbodies three, lax-ascending to erect, repeatedly pyxidately branched, up to 25 mm high, up to 12 mm broad (but pressed), now dark brown and cartilaginous. All parts slender, with stipe not exceeding 1.5 mm diam., and branches considerably less than 1 mm diam., arising from a minutely hispid, small mycelial pad on wood; branches in 3–4 ranks; apices less than 1 mm long, acerose, extremely fine.

Tramal hyphae of two kinds: a) generative, 4–8 μm diam., hyaline, thin-walled, clamped, loosely parallel; and b) gloeoplerous, 4–7 μm diam., yellow under phase contrast, coscinoidal. Hymenium thickening, of three elements: (a) basidia 20–25 \times 3.5–4.0 μm , narrowly clavate, adherent but not gelatinized; (b) leptocystidia, vaguely ventricose, 3–5 μm diam.; and (c) gloeocystidia, 4–7 μm diam., hardly emergent from hymenium, rounded-lanceolate.

Spores 4–5 \times 3–3.5 μm , subglobose to broadly ovate, thin-walled, weakly amyloid, asperulate.

Dodd (1972. In *Mycologia* 64: 755–756) treated this species, and it is from his dissertation (1970, Univ. Tennessee) that some of the information above was gathered. Corner (1950), while adopting the name as separate from others, was unsure of synonymy under it, but Dodd and Corner (1970) agreed that *Clavicornia candelabrum* Massee exhibited thick-walled tramal hyphae.

There are two common taxa of *Clavicornia* in New Zealand, readily separable in the field, for the fruitbodies of one [*C. piperata* (Kauffman) Leath. & Smith] are much more robust and stouter than those of the other. *Clavicornia colensoi* seems endemic, while *C. piperata*, according to Dodd, may occur around the Pacific bowl, including western North America.

Clavaria dealbata Berkeley. 1856. In J. Bot. (ed. Hooker) 8: 275.

\equiv *Lachnocladium dealbatum* (Berk.) Cooke. 1901. In *Grevillea* 20: 10.

\equiv *Scytinopogon dealbatum* (Berk.) Corner. 1970. In *Beih. Nova Hedwigia* 33: 89.

Holotype: K – Brazil, Panur , iii.1853, *Spruce 159*; merotype: FH.

Fruitbodies two, up to 3×2 cm, arbuscular, pressed. Stipe 8×1 mm, discrete, somewhat flattened, covered with loose, delicate, pale tomentum. Primary branches two; branches dichotomous throughout, in 3–4 ranks, terete; internodes short, hardly diminishing; axils lunate to rounded, slightly expanded; apices acrose, awl-shaped.

Trama hyphae $2\text{--}7\ \mu\text{m}$ diam., hyaline, clamped, thin-walled, free, parallel. Basidia $14\text{--}20 \times 5\text{--}6\ \mu\text{m}$, clamped, broadly clavate to barrel-shaped, not adherent; sterigmata 4, slender, divergent.

Spores (Fig. 5) $3.4\text{--}3.8 \times 2.4\text{--}3.0\ \mu\text{m}$ ($E = 1.17\text{--}1.46$; $E_m = 1.27$; $L_m = 3.52\ \mu\text{m}$), broadly ellipsoid to subglobose, slightly flattened adaxially; wall thin; contents homogeneous; hilar appendix not prominent; ornamentation of acute spines up to $0.3\ \mu\text{m}$ long, scattered over wall surface.

The above is taken from the FH merotype, while Corner's (1970) examination assumedly was from Kew material. In 1950, Corner included the epithet as perhaps a form of *Ramariopsis kunzei*, but in 1970, he transferred the species to *Scytinopogon*. At the same time (p. 86) he indicated that *Scytinopogon* had 'begun to lose character and to merge at the clavarioid end with *Ramariopsis* ...'

I am disposed to accept *C. dealbata* as representative of a taxon of *Ramariopsis*. Basidia and tramal hyphae are typical of this genus, and tramal clamps are conspicuous, unlike those of *Scytinopogon*. Spores are not angular, but broadly ellipsoid, beset with spines quite typical of the rough-spored *Ramariopsis* taxon. Spore size is quite small for *Scytinopogon*, but typical for *Ramariopsis*. Fruitbody color and shape are very similar to those of *R. kunzei* but in *Scytinopogon* branches are usually flattened. All in all, removal of *C. dealbata* from *Scytinopogon* would leave the latter more homogeneous.

Ramariopsis dealbata (Berk.) R. H. Petersen, *comb. nov.* — Basionym: *Clavaria dealbata* Berk. 1856. In J. Bot. (ed. Hooker) 8: 275.

Clavaria decolor Berkeley & Curtis. 1858. Proc. Am. Acad. (Arts. Sci.) 4: 124.

Type specimen (holotype): FH — Hong Kong, Ringgold & Rodgers Exp., 14.viii.1854, C. Wright, s.n. (no. 112 of expedition labels); isotype: K-(specimen missing, only sketch remaining).

Fruitbodies (Fig. 4) two, 25×5 mm and 29×3 mm, branched, pressed, now dull ochraceous olive, arising from a strigose-felty basal mat including debris and siliceous chips (mat probably white when fresh; now dull ivory-ochre). Stipe discrete, here and there covered with extension of basal mat, probably circum 2 mm thick when fresh. Major branches two, rebranching 1–2 ranks, terete when fresh; axils narrowly rounded; apices acute, dichotomous to irregular; hymenium apparently amphigenous but axils decurrent-sterile and browner than hymenial surface. Color 'white — soon turning brown or black' (teste Wright).

Tramal hyphae and basidia clamped, not supporting further analysis.

Spores (Fig. 3) $11.9\text{--}13 \times 4.7\text{--}5.8\ \mu\text{m}$ ($E_m = 2.31$; $L_m = 12.54\ \mu\text{m}$), comma-shaped to curved teardrop-shaped, grossly ornamented; contents homogeneous (with age?); wall up to $0.2\ \mu\text{m}$ thick, thinner apically; hilar appendix almost indistinguishable as an extension of the spore; ornamentation of gross spines up to $2.5\ \mu\text{m}$ long distally and proximally, and transverse ridges with crests medially.

Corner described *Ramaria zippelii* var. *cristatospora*, which was accepted at species rank by Petersen. *Clavaria decolor* is the same organism, and a new combination is required, as follows:

Ramaria decolor (B. & C.) R. H. Petersen, *comb. nov.*. Basionym: *Clavaria decolor* Berkeley & Curtis (l.c.).

≡ *Ramaria zippelii* var. *cristatospora* Corner. 1967. J. Linn. Soc. Lond. 178: 103.

≡ *Ramaria cristatospora* (Corner) R. H. Petersen. 1981. *Biblta mycol.* 79: 64.

The epithet surely must come from Wright's notes concerning color changes from white to brown or black, but whether this was a bruising reaction (I suspect so) or an ontogenetic progression is unknown. No such process was reported by Corner for *R. zippelii* var. *cristatospora*.

Corner's (1950) series *Decolorans* of *Ramaria* was derived from *Clavariella decolorans* Karsten.

Lachnocladium furcellarioides P. Hennings 1899. In *Monsunia* 1: 142.

Holotype: — Java, Tjibodas, 24.vi.1898, *M. Fleischer*, s.n.

Fruitbody single, on wood, 68 × 8 mm, branched. Stipe 36 × 2 mm, erect, brownish black, terete, hard, smooth; branches dichotomous, ascending-erect, terete, up to 1.5 mm thick; axils narrowly rounded; internodes long, hardly diminishing; apices long, awl-shaped to acerose, dark brown.

Tramal hyphae of two types: (1) generative, hyaline, 2–3 µm diam., clamped, thin-walled, uncommon; and (2) skeletal, 2.5–5 µm diam., brown, branched, arising from clamp connections, with occasional 'cloisons de retrait', producing common flagelliform hyaline side branches from clamp connections.

Basidia 13–16 × 5 µm, broadly clavate, clamped, pale yellow under phase contrast; contents granular; sterigmata 4.

Spores not observed.

This is surely a *Lachnocladium*, but the skeletal hyphae are not differentiated into clearcut dichophyses or asterosetae. In fact, they give off hyaline, thin-walled (generative) branches at clamped septa, and so are not typical of the dichophyses of *Lachnocladium*.

Hennings reported that the spores of the type were 3.5–4 × 3–3.5 µm, smooth and hyaline to pale yellow, but I observed no spores. Not emphasizing this genus in my research, I am loath to use more material to check the spores, and it remains for future workers to ascertain the place of the taxon more specifically than to genus.

Clavaria holmskjoldii Oudemans. 1902. In *Beih. bot. Zentbl.* II: 525.

≡ *Clavulinopsis holmskjoldii* (Oudem.) Corner. 1950. In *Ann. Bot. Mem.* I: 373.

≡ *Ramariopsis holmskjoldii* (Oudem.) R. H. Petersen. 1978. In *Mycologia* 70: 668.

Lectotype: L — Netherlands, Bergen op Zoom, xi.1900, ad terram, *la Fontijn*, L. no. 939.194.701 (annot. C. Cool).

Fruitbodies two, up to 5 × 4 cm, pressed, branched, ramarioid. Stipe 7 × 7 mm, rounded at base, probably white, sulcate, tapering downward. Major branches two, short (–6 mm), stout (–4 mm broad), rebranching in 2–4 ranks; branches probably terete when fresh, dichotomous throughout, white or whitish when fresh (teste Oudemans); internodes longest in median area, diminishing downward and upward; axils lunate; apices digitate to subclavate, up to 2 mm thick, avellaneous when fresh (teste Oudemans).

Tramal hyphae 2–6 μm diam., thin-walled, hyaline, clamped, interwoven to generally parallel, free. Hymenium thickening significantly; basidia 60–110 \times 8–9 μm , clavate, usually with attenuate base, clamped, hyaline to pale yellow under phase contrast; sterigmata 4, long, stout, subcornute.

Spores 6.8–8.3 \times 6.1–7.2 μm ($E = 1.00$ – 1.18 ; $E^m = 1.10$; $L^m = 7.27 \mu\text{m}$), globose to subglobose, hyaline; wall thin, smooth; contents opalescent to uniguttulate; hilar appendix very large, conical, up to 2.5 μm long.

Corner (1950) correctly interpreted Oudemans' circumscription as pertaining to *Clavulinopsis*, but Petersen (1978a), in reorganizing three genera, transferred the epithet to *Ramariopsis*. Examination of the type confirms that the spores are very strongly apiculate and that the basidia are among the longest in the clavarioid fungi. Oudemans drew attention to the anise-like odor, also reported by Petersen (1971: in *Persoonia* 6: 225).

Oudemans associated his species with Holmskjöld's circumscription of '*Ramaria coralloides alba apicibus purpurascens*', which has been cited as synonymous with *Ramaria botrytis*. This species has been accepted as the type of *Ramaria*, but Holmskjöld's fungus has also been identified as some form of *Clavulina cristata*. Oudemans' opinion was as good as others, but no better, for no Holmskjöld specimen remains, nor any authentic report on spores or other micromorphological characters. The problem, therefore, has moved from taxonomy to nomenclature, in which Holmskjöld's name has been 'legislated' as a *Ramaria*.

Oudemans reported on collections from September and December, 1900, from the same location. Two specimens at L conform to this (no. 939.194.671, 10.xii.00; no. 939.194.673, 16.xii.00) and qualify as paratypes, although their labels indicate syntypes.

Claviariella holsatica P. Hennings. 1888. In *Kryptog.-Fl. Schles.* 3: 240.

≡ *Clavaria holsatica* (P. Henn.) Sacc. 1895. *Syll. Fung.* II: 134.

≡ *Ramaria holsatica* (P. Henn.) Corner. 1950. In *Ann. Bot. Mem.* I: 597.

Type (neotype): S – Holsatia, ix.1898, *P. Hennings*, s.n.

Fruitbodies (Fig. 6) up to 20 \times 4 mm, caespitose in clusters of 3–13, broadly club-shaped, on moss, minutely rugose-cristate, off-white, branched once or twice.

Tramal hyphae 2.5–5 μm diam., hyaline, clamped, free, thin-walled. Basidia 30–40 \times 6–8 μm , narrowly clavate to subcylindrical, clamped, hyaline; sterigmata two, divergent, somewhat cornute.

Figs. 1, 2. *Lachnocladium atkinsonii*. — 1. Spore. — 2. Outline of fruitbody.

Fig. 3, 4. *Clavaria decolor*. — 3. Spore. — 4. Fruitbody.

Fig. 5. *Clavaria dealbata*, spore.

Fig. 6. *Clavaria holsatica*, fruitbody.

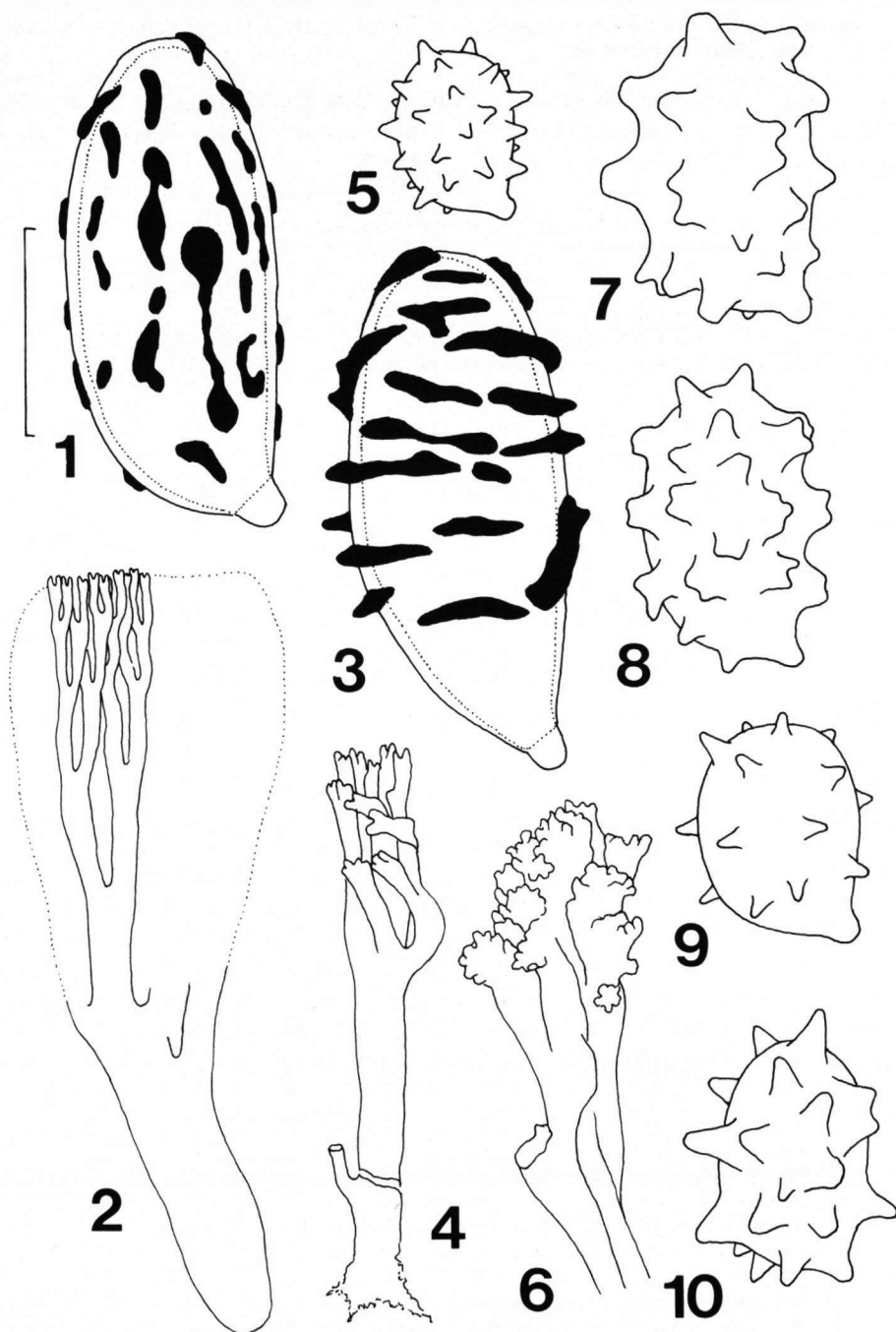
Fig. 7. *Clavaria implexa*, spore.

Fig. 8. *Clavaria umbrina*, spore.

Fig. 9. *Clavaria semivestita*, spore.

Fig. 10. *Lachnocladium chartaceum*, spore.

Standard line = 5 μm for spores. Fruitbody sizes given in text.



Spores $7.4-8.6 \times 5.6-7.8 \mu\text{m}$, broadly ellipsoid to subglobose, hyaline, thin-walled; hilar appendix abrupt, papillate.

Although transferring this species to *Ramaria*, Corner (1950) stated: 'The branching and subglobose spores suggest *Clavulina*.' The specimen represents a depauperate cluster of a *Clavulina* similar to, or contaxic with *C. cristata*.

This specimen cannot qualify as holo- or lectotype material, for it was collected some years after the original description. Concomitantly, however, the specimen matches the description and was collected on topotype ground by the original author.

Clavaria implexa Léveillé. 1846. In *Annls Sci. nat. (Bot.)* III 5: 154.

Holotype: PC — herb. Léveillé, Java, 'ad terram, Tjikoya,' no date, *Zollinger 1311* (included under primary label to *Clavaria umbrina* Lév., no. 2077); merotype: BPI, ex herb. Bresadola.

Fruitbody single, $34 \times 17 \text{ mm}$, arbuscular, much-branched. Stipe $7 \times 3 \text{ mm}$, discrete, somewhat flattened, hard, with very thin white mycelial 'bloom' at base. Major branches two, about 2 mm thick; branches in 5–7 ranks, mostly dichotomous, somewhat flattened (? by pressing), now slightly cartilaginous, very slender; internodes short, hardly diminishing; axils rounded; apices long, awl-shaped, much less than 1 mm thick.

Trama hyphae $3-7 \mu\text{m}$ diam., hyaline, clamped, adherent to somewhat agglutinated, thin-walled. Basidia not observed.

Spores (Fig. 7) $5.9-6.7 \times 3.7-4.4 \mu\text{m}$ ($E = 1.31-1.80$; $E_m = 1.44$; $L_m = 5.79 \mu\text{m}$), ellipsoid, perhaps adaxially flattened, grossly roughened; contents homogeneous; wall thin; hilar appendix not prominent; ornamentation of molar-shaped or pronged warts up to $0.8 \mu\text{m}$ high, so large as to obscure the general profile of the spore.

Except for the height of the fruitbody, Léveillé's description matches the PC and BPI specimens well, but this could be said almost equally of his description of *C. umbrina*. I am persuaded that this specimen represents *C. implexa* because the BPI merotype cites only one number and includes only one taxon.

Corner (1950) correctly treated the epithet under *Scytinopogon*, but in 1970, included it only in a discussion of my report under *Clavaria umbrina* (q.v.). Using Corner's (1970: 87) key to *Scytinopogon* taxa, I am led to *S. echinospora*. The tramal hyphae are somewhat inflated, but no papillae are visible on the undersides of the branches. This would mean that the type specimens of both *C. implexa* and *C. umbrina* were of the same taxonomic species, although the tramal hyphae of the latter are not inflated. Their spores are nearly identical. I am not familiar enough with the micromorphological variation within the genus to make pronouncements on synonymy, and so demur from doing so.

Clavaria javanica Saccardo & Sydow. 1890. *Syll. Fung.* 14: 258.

\equiv *Clavaria coronata* Zippel apud Léveillé. 1944. In *Annls Sci. nat. (Bot.)* III 2: 215. (non *C. coronata* Schweinitz. 1832).

\equiv *Clavicorona javanica* (Sacc. & Syd.) Corner. 1950. In *Ann. Bot. Mém.* I: 289.

Holotype: L — herb. Zippel, Java, on wood (not seen); merotype: ?K.

Saccardo and Sydow avowedly supplied only a new name, for Zippel's epithet (published by Léveillé) was preempted by that of Schweinitz. Therefore, both Zippel's *coro-*

nata and Saccardo's *javanica* must be represented by the same type specimen, namely that of the earlier epithet. The specimen cited by Corner (1950: 290) as the type cannot be accepted. Lévillé clearly stated the type from Zippel's collections. If it may be assumed that the Lévillé material alluded to by Corner (1950: 291) is a portion of the type, then there would seem even less reason to accept Corner's collection in that capacity.

Clavaria rhizomorpha Berkeley, 1860. In Hooker, *Flora Tasmaniae* I: 242.

Type specimen (holotype): K — Tasmania, no date, *Archer*, herb. Berkeley, s.n. Isotype: PDD.

The specimen consists of two fragments of wood, on one of which is a sheet of membranous mycelium with a few finger-like projections. I can find no sign of basidia or spores, but the hyphae are clamped.

The fungus could be very juvenile agaric fruitbodies, aberrant productions of mycelium within the rotten wood, or almost any other form. The name should be rejected as a *nomen dubium*.

Clavaria semivestita Berkeley & Broome. 1874. In J. Linn. Soc. (Bot.) 14: 75.

≡ *Clavulinopsis semivestita* (B. & Br.) Corner. 1950. In *Ann. Bot. Mem.* 1: 387.

Type specimen (holotype): K — Peradeniya, Ceylon, herb. Berkeley, no date, no. 677.

Fruitbodies four, up to 25 mm high, up to 15 mm broad, branched from the base or with discrete stipe up to 10 × 2 mm. Stipe base conical, minutely felty or minutely tomentose, involving a small ball of sandy soil, and arising from an extensive but thin mycelial mat; stipe terete to somewhat flattened, straight or ascending. Major branches 2–3; branching more or less dichotomous throughout; branches terete; axils rounded but narrow; internodes diminishing gradually in three fruitbodies; apices minutely, abruptly, repeatedly dichotomous in three fruitbodies. Color (teste Berkeley and Broome) white, then brownish to yellow brown in age, drying ochraceous to ochraceous brown. One fruitbody with flattened, palmate flaring of stipe and irregularly cristate apices.

Tramal hyphae 1.8–3.5 μ m diam., hyaline, clamped, free, generally parallel. Hymenium thickening, coherent on drying; basidia not supporting measurement, but not more than 25 × 6 μ m; sterigmata 4, slender, erect.

Spores (Fig. 9) 4.3–5.0 × 3.6–4.3 μ m ($E = 1.08$ –130; $E_m = 1.20$; $L_m = 4.75$ μ m), subglobose to broadly ellipsoid, thin-walled; hilar appendix abrupt, papillate; ornamentation of scattered prickles up to 0.3 μ m long.

Corner (1950) recombined Berkeley and Broome's epithet under *Clavulinopsis*, presumably based on the original circumscription, and Petch's (1925) later report. The small, spiny spores, small basidia, branched fruitbodies and clamped hyphae (presumably the spores are hyaline) combine to dictate its true placement in *Ramariopsis* subg. *Ramariopsis*. Previously, I (Petersen, 1978b) reported on the genus from southeastern Australia, where *R. cinnamomea* and *R. kunzei* both strongly resemble *C. semivestita*. The original authors described the color as 'ochracea', so I am persuaded to place the taxon with *R. cinnamomea*, over which epithet it would take priority. Concomitantly, one must wonder whether the original circumscription referred to fresh colors or to colors of the specimen when it arrived in England. Corner (1950) gathered

the conclusion that fruitbodies were white, then brownish, from Petch (1925) who reported them so, in spite of his quotes from the original circumscription. Petch also reported the spores as 'smooth, globose, 5–7 μm diameter', repeated by Corner.

Berkeley and Broome, and Petch cited the type specimen ambiguously. From Petch's analysis, no. 677 must have covered specimens named *C. echinospora* and *C. semivestita*, and some of the latter may have found their way into the Currey Herbarium (at K) under the same number. Of the four fruitbodies now present in herb. Berkeley, two are glued to paper, the other two are free in a small packet, but one of these was glued sometime in its history. They all represent the same taxon, however, and one must assume that they were part of the original specimen.

Lachnocladium tonkinense Patouillard. 1981. In J. Bot. (ed. Morot) 5: 314.

Holotype: FH – herb. Patouillard, Tonkin, no date, *Bon 4043* (annot. Corner, ix.55); merotype: NY.

Fruitbodies three, on wood (monocot, teste Patouillard) up to 22×13 mm, pressed, branched, arising from a large patch of effuse mycelium (probably white when fresh). Stipe very short, almost branched from base, pruinose-tomentose at base, up to 2.5 mm broad. Major branches up to 4, rebranched in 2–3 ranks, branches tan to fleshy tan; internodes diminishing gradually; axils narrowly rounded; apices awl-shaped or minutely dichotomous.

Tramal hyphae 3–7 μm diam., hyaline, thin- to somewhat thick-walled (wall up to 0.5 μm thick), conspicuously clamped, free, more or less parallel. Basidia $60\text{--}80 \times 8\text{--}11$ μm , broadly clavate, hyaline, clamped, sterigmata 4.

Spores $12.6\text{--}15.1 \times 3.6\text{--}5.4$ μm ($L^m = 14$ μm) boletoid to cylindrical-swayback, thin-walled, hyaline.

Both portions of the type bear abundant contaminant spores, but these do not hinder more pertinent observations. All features are typical of *Lentaria surculus*, as surmised by Corner, and I accept the epithets as synonymous. Basidiospores are not common, and too few were measured for accurate E-values.

Clavaria umbrina Lévillé. 1846. In *Annls Sci. nat. (Bot.)* III 5: 393.

\equiv *Clavulinopsis umbrina* (Lév.) Corner. 1950. In *Ann. Bot. Mem.* I: 393.

Holotype: PC – herb. Lévillé, Java, Tjikoya, no. 2077, *Zollinger*; merotype: FH – (cf. Petersen. 1968. In *Sydowia* 21: 21).

Fruitbody single, 55×30 mm, much branched, pressed. Stipe 4×2.5 mm, roughened. Branches up to 2 mm thick, in 6–9 ranks, flattened (? in pressing), internodes up to 4 mm long, hardly diminishing; axils rounded, apices awl-shaped, minute, acerose. Hymenium unilateral.

Tramal hyphae 1.5–4 μm diam., hyaline, clamped, tightly packed, parallel, now adherent. Basidia not observed.

Spores (Fig. 8) $5.8\text{--}6.5 \times 3.6\text{--}4.3$ μm ($E = 1.45\text{--}180$; $E^m = 1.56$, $L^m = 6.16$ μm), ellipsoid, grossly roughened, thin-walled, apparently hyaline; contents homogeneous; hilar appendix papillate, hardly prominent; ornamentation of flattened or molar-shaped warts up to 0.7 μm high, often confluent.

Corner (1970: 41) took me to task for transcribing the label notes from the FH portion of this specimen. That label bore two numbers, 2077 and 1311, which correspond to two different epithets, and Corner rightly complained that there was confusion over epithets, and that there was confusion over the use of the name, therefore. Instead of examining type material, however, he continued to treat the epithet under *Clavulinopsis*.

The situation is clarified by the PC specimen. Again, the label refers to two numbers, the data being as follows: '2077. *Clavaria umbrina* Lév. (writing no. 1), *affin Clavaria kunzei* Fr. no. 1311 (writing no. 2) *ad terram* Tjikoya (writing no. 1), *scripsit* Lévillé. *In Java legit* Zollinger (writing no. 3).'

Moreover, two specimens are present. The fruitbody in the outer packet is described above under *Clavaria implexa*, and matches a portion of no. 1311 at BPI. The presence of two specimens, both types, under one packet label explains the confusion which may have been perpetuated by my report.

Lévillé wrote of specimens in the Paris herbarium, so his statement 'Toute la plante est d'une couleur brun-fauve' may have referred to the fruitbody when he saw it, not fresh. Even so, the ornamentation of the spores and the very profuse, delicate branches match the description of *Scytinopogon echinospora* (B. & Br.) Corner furnished by Corner (1970) from type material.

Corner (1950) treated the epithet under *Clavulinopsis*. Further on (Corner, 1970), the name was treated under *Clavaria* (p. 41), where no new taxonomic data were furnished, nor an explanation of why the epithet was so placed, and again under *Clavulinopsis* (p. 78).

In my previous report on the FH portion of the type, I did not observe clamps. They are not prominent, but are present on tramal hyphae. I was not equipped at that time to place a name on the specimen, but now this seems possible. *Clavaria umbrina* should be considered for synonymy under Corner's concept of *Scytinopogon echinospora*.

LITERATURE CITED

- BURT, E. A. (1922). The North American species of *Clavaria* with illustrations of the type specimens. In *Bull. Mo. bot. Gdn* 9: 1-78.
- COKER, W. C. (1923). 'The Clavarias of the United States and Canada.' Chapel Hill, 209 pp..
- CORNER, E. J. H. (1950). A monograph of *Clavaria* and allied genera. In *Ann. Bot. Mem.* 1: 1-740.
- (1970). Supplement to "A monograph of *Clavaria* and allied genera." In *Beih. Nova Hedwigia* 33: 1-299.
- PETCH, T. (1925). Notes of Ceylon Clavariae. In *Ann. R. bot. Gdn Peradeniya* 9: 329-338.
- PETERSEN, R. H. (1978a). Notes on clavarioid fungi. XV. A realignment of *Clavaria*, *Clavulinopsis*, and *Ramariopsis*. In *Mycologia* 70: 660-671.
- (1978b). The genus *Ramariopsis* in southeastern Australia. In *Aust. J. Bot.* 26: 425-431.
- (1980). Type studies in the Clavariaceae. VI. Four pivotal species from the Pacific tropics. In *Mycotaxon* 12: 281-286.
- (1981). '*Ramaria* subgenus *Echinoramaria*.' In *Biblta mycol.* 79: 1-261.
- SINGER, R. (1945). New genera of fungi — II. In *Lloydia* 8: 139-144.